

A man moves on his motorbike with 54 km/h and then takes a u-turn and continues to move with same speed. The time of u-turn is 10 sec. Find the average acceleration during u-turn.

Solution:

During the u-turn motorbike is moving in a circle at a constant speed, so it acts centripetal acceleration. In the process of turning a motorbike passes a half of the circle with a radius R:

$$\frac{2\pi R}{2} = Vt; t = 10s, V = 54 \frac{km}{h} = 15 \frac{m}{s}$$

$$R = \frac{Vt}{\pi} \quad (1)$$

Centripetal acceleration formula:

$$a = a_{centr} = \frac{V^2}{R} \quad (2)$$

$$(1) \text{ in } (2): a = \frac{\pi V^2}{Vt} = \frac{\pi V}{t} = \frac{3.14 * 15 \frac{m}{s}}{10s} = 4.71 \frac{m}{s^2}$$

Answer: average acceleration $4.71 \frac{m}{s^2}$

